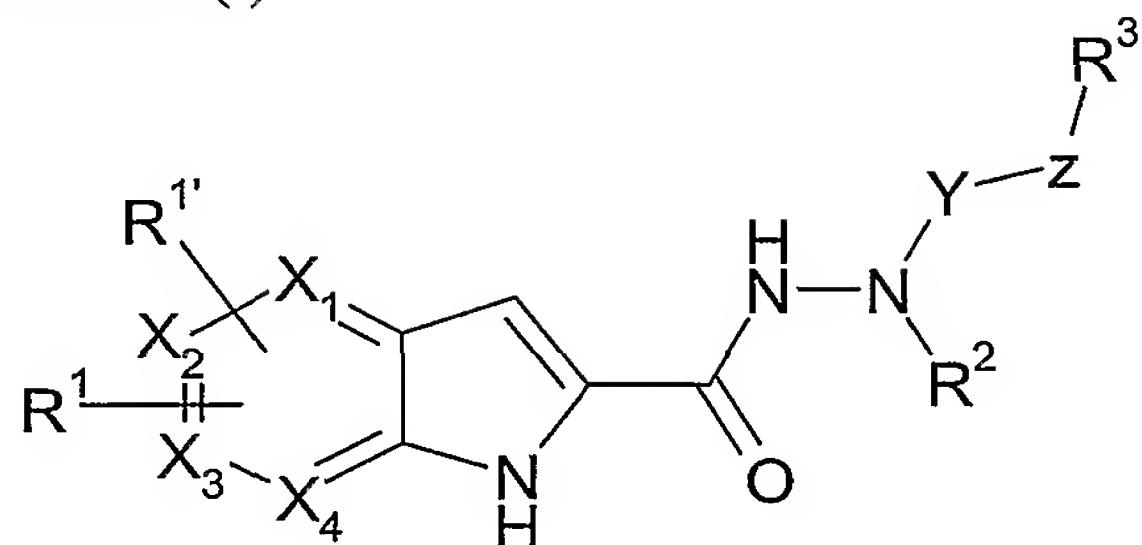


CLAIMS:

1. A compound of formula (I):



I

or a pharmaceutically acceptable salt thereof, wherein:

one of X₁, X₂, X₃ and X₄ is N and the others are C;

Y is -C(O)-, -S(O)₂-, or -C(NH)-;

Z is C₁₋₄alkylene, oxygen, -(CH₂)_mO-, -O(CH₂)_m-, -NR-, -(CH₂)_mNR-, -NR(CH₂)_m-, -(CH₂)_mS(O)₂-, or a bond;

m is 1, 2, 3, or 4;

R is C₀₋₄alkyl, C₀₋₄alkylaryl, or C₀₋₄alkylhetaryl;

R¹ and R^{1'} are each independently, halogen, hydroxy, cyano, C₀₋₄alkyl, C₁₋₄alkoxy, fluoromethyl, difluoromethyl, trifluoromethyl, ethenyl, or ethynyl;

R² is C₀₋₄alkyl, COOR⁶, COR⁶, C₁₋₄alkoxyC₁₋₄alkyl-, hydroxyC₁₋₄alkyl-, cycloalkylC₀₋₄alkyl-, arylC₀₋₄alkyl-, or hetarylC₀₋₄alkyl-, wherein any of the aryl or hetaryl rings are optionally substituted with 1-2 independent halogen, cyano, C₁₋₄alkyl, C₁₋₄alkoxy, -N(C₀₋₄alkyl)(C₀₋₄alkyl), -SO₂C₁₋₄alkyl, -SO₂N(C₀₋₄alkyl)(C₀₋₄alkyl), hydroxy, fluoromethyl, difluoromethyl, or trifluoromethyl substituents;

R³ is hydrogen, -COOC₀₋₄alkyl, C₁₋₄alkoxy, C₁₋₄alkyl, arylC₁₋₄alkylthio-, -C₀₋₄alkylaryl, -C₀₋₄alkylhetaryl, -C₀₋₄alkylcycloalkyl, or -C₀₋₄alkylheterocyclyl, wherein any of the rings is optionally substituted with 1-3 independent halogen, cyano, C₁₋₄alkyl, fluoromethyl, difluoromethyl, trifluoromethyl, -C₀₋₄alkylNHC(O)O(C₁₋₄alkyl), -C₀₋₄alkylNR⁷R⁸, -C(O)R⁹, C₁₋₄alkoxyC₀₋₄alkyl-, -COOC₀₋₄alkyl, -C₀₋₄alkylNHC(O)R⁹, -C₀₋₄alkylC(O)N(R¹⁰)₂, -C₁₋₄alkoxyC₁₋₄alkoxy, hydroxyC₁₋₄alkyl-, -NHSO₂R¹⁰, -SO₂(C₁₋₄alkyl), -SO₂NR¹¹R¹², 5- to 6-membered heterocyclyl, phenylC₀₋₂alkoxy, or phenylC₀₋₂alkyl substituents, wherein phenyl is optionally substituted with 1-2 independent halogen, cyano, C₁₋₄alkyl, C₁₋₄alkoxy, -N(C₀₋₄alkyl)(C₀₋₄alkyl), -SO₂C₁₋₄alkyl, -SO₂N(C₀₋₄alkyl)(C₀₋₄alkyl), hydroxy, fluoromethyl, difluoromethyl, or trifluoromethyl substituents, or two bonds on a ring carbon of the heterocyclyl group optionally can form an oxo (=O) substituent;

or R³ is -NR⁴(-C₀₋₄alkylR⁵);

R⁴ is C₀₋₃alkyl, -C₂₋₃alkyl-NR⁷R⁸, C₃₋₆cycloalkyl optionally substituted by hydroxyC₀₋₄alkyl- further optionally substituted by hydroxy, C₁₋₂alkoxyC₂₋₄alkyl-, or C₁₋₂alkyl-S(O)_n-C₂₋₃alkyl-;

n is 0, 1, or 2;

R⁵ is hydrogen, hydroxyC₂₋₃alkyl-, C₁₋₂alkoxyC₀₋₄alkyl-, or aryl, hetaryl, or heterocyclyl;

wherein a heterocyclic nitrogen-containing R⁵ ring optionally is mono-substituted on the ring nitrogen with C₁₋₄alkyl, benzyl, benzoyl, C₁₋₄alkyl-C(O)-, -SO₂C₁₋₄alkyl, -SO₂N(C₀₋₄alkyl)(C₀₋₄alkyl), C₁₋₄alkoxycarbonyl, or aryl(C₁₋₄alkoxy)carbonyl; and wherein the R⁵ rings are optionally mono-substituted on a ring carbon with halogen, cyano, C₁₋₄alkyl-C(O)-, C₁₋₄alkyl-SO₂-, C₁₋₄alkyl, C₁₋₄alkoxy, hydroxy, -N(C₀₋₄alkyl)(C₀₋₄alkyl), hydroxyC₀₋₄alkyl-, or C₀₋₄alkylcarbamoyl-, provided that no quaternised nitrogen is included; or two bonds on a ring carbon of the heterocyclyl group optionally can form an oxo (=O) substituent;

R⁶ is C₁₋₄alkyl, aryl, or hetaryl;

R⁷ and R⁸ are independently C₀₋₄alkyl, C₃₋₆cycloalkyl, or CO(C₁₋₄alkyl);

R⁹ is C₁₋₄alkyl, or C₃₋₆cycloalkyl;

R¹⁰ is C₀₋₄alkyl, or C₃₋₆cycloalkyl; and

R¹¹ and R¹² are independently C₀₋₄alkyl or together with the nitrogen to which they are attached may form a 4- to 6-membered heterocycle;

provided there are no nitrogen-oxygen, nitrogen-nitrogen, oxygen-oxygen or nitrogen-halogen bonds in the grouping -Y-Z-R³.

2. A compound according to claim 1, or a pharmaceutically acceptable salt thereof, wherein X₃ is N.

3. A compound according to claim 1, or a pharmaceutically acceptable salt thereof, wherein X₁ is N.

4. A compound according to any one of the preceding claims, or a pharmaceutically acceptable salt thereof, wherein Y is -C(O)- or -S(O)₂-.

5. A compound according to any one of the preceding claims, or a pharmaceutically acceptable salt thereof, wherein Z is C₁₋₄alkylene, oxygen, -(CH₂)_mO-, -NR- or a bond.

6. A compound according to any one of the preceding claims 1, or a pharmaceutically acceptable salt thereof, wherein R¹ and R^{1'} are each independently, hydrogen or halogen.

7. A compound according to claim 6, or a pharmaceutically acceptable salt thereof, wherein one of R¹ and R^{1'} is hydrogen and the other is 5-chloro.

8. A compound according to any one of the preceding claims, or a pharmaceutically acceptable salt thereof, wherein R² is hydrogen.

9. A compound according to any one of the preceding claims, or a pharmaceutically acceptable salt thereof, wherein R³ is hydrogen, -NR⁴R⁵, -NR⁴(-C₁₋₄alkylR⁵), aryl, hetaryl, or heterocyclyl wherein any of the rings is optionally substituted as defined in claim 1.

10. A compound of formula (I) as defined in any one of Examples 1 to 25, or a pharmaceutically acceptable salt thereof.

11. A pharmaceutical composition comprising a compound according to any one of claims 1 to 10, or a pharmaceutically acceptable salt thereof, and a pharmaceutically acceptable carrier.

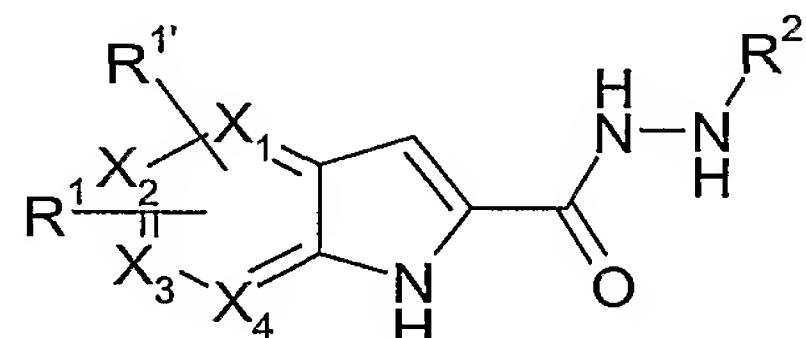
12. A method for the treatment of a disease or condition in which glycogen phosphorylase plays a role comprising a step of administering to a subject in need thereof an effective amount of a compound according to any one of claims 1 to 10, or a pharmaceutically acceptable salt thereof.

13. A method for the treatment of hyperglycemia or diabetes comprising a step of administering to a subject in need thereof an effective amount of a compound according to any one of claims 1 to 10, or a pharmaceutically acceptable salt thereof.

14. A method for the prevention of diabetes in a human demonstrating pre-diabetic hyperglycemia or impaired glucose tolerance comprising a step of administering to a subject in need thereof an effective prophylactic amount of a compound according to any one of claims 1 to 10, or a pharmaceutically acceptable salt thereof.

15. A method for the treatment of hypercholesterolemia, hyperinsulinemia, hyperlipidemia, hypertension, atherosclerosis or tissue ischemia, or achieving cardioprotection or inhibition of abnormal cell growth, comprising a step of administering to a subject in need thereof an effective amount of a compound according to any one of claims 1 to 10, or a pharmaceutically acceptable salt thereof.

16. A compound of formula (IV):



IV

wherein R¹, R^{1'}, R², X₁, X₂, X₃ and X₄ are as defined in claim 1, or a protected derivative thereof.